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FLOOD INSURANCE STUDY

CITY OF TEMPLE TERRACE, FLORIDA

HILLSBOROUGH COUNTY

JUNE 18, 1990

Federal Emergency Management Agency

COMMUNITY NUMBER 120115

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

This publication incorporates revisions to the original Flood Insurance Study. These revisions are presented in Section 9.0.

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1.0 INTRODUCTION

1.1 Purpose of Study

The purpose of this Flood Insurance Study is to investigate the existence and severity of flood hazards in the City of Temple Terrace, Hillsborough County, Florida, and to aid in the administration of the Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. Initial use of this information will be to convert Temple Terrace to the regular program of flood insurance by the Federal Insurance Administration. Further use of the information will be made by local and regional planners in their efforts to promote sound land use and flood plain development.

1.2 Coordination

Several meetings were held between the U. S. Geological Survey and the U. S. Army Corps of Engineers to discuss the hydraulics of the Hillsborough River.

An intermediate consultation and coordination meeting was held in Tampa on May 23, 1975, to explain the nature and purpose of a Flood Insurance Study and to give a detailed presentation of Flood Insurance Study procedures and the preliminary results of this study. Representatives from the U. S. Army Corps of Engineers, the Federal Insurance Administration, and local officials of Temple Terrace were in attendance.

A final consultation and coordination meeting to present the results of the Flood Insurance Study was held in Temple Terrace on December 17, 1975. Representatives from the U. S. Army Corps of Engineers, the Federal Insurance Administration, local officials, and residents of Temple Terrace were in attendance.

1.3 Authorization and Financing

This Flood Insurance Study was conducted by the U. S. Department of the Army, U. S. Army Corps of Engineers, Jacksonville District, at the request of the Federal Insurance Administration, U.S.

Department of Housing and Urban Development. The source of authority for this study is the National Flood Insurance Act of 1968, as amended. Authority and financing are contained in Inter Agency Agreement Nos. IAA-H-19-74 and IAA-H-16-75, Project Order Nos. 17 and 4 respectively.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the City of Temple Terrace. The area of study is shown on the Vicinity Map (Figure 1).

The Hillsborough River forms the eastern and southern city limits of Temple Terrace and is the only source of flooding in Temple Terrace. The entire area of Temple Terrace was studied in detail.

The U. S. Army Corps of Engineers has initiated construction on several phases of a flood control project in the Hillsborough River Basin. Floodwater levels will be significantly reduced along the Hillsborough River when the project is completed. However, the full benefits from the Tampa Bypass Canal and the Lower Hillsborough Flood Detention Area cannot be realized until the project is 100-percent complete. The estimated completion date for the project is fiscal year 1979, and that date is dependent on Congress appropriating funds to the U. S. Army Corps of Engineers in fiscal years 1977 and 1978. Therefore, the effect of the Tampa Bypass Canal and Lower Hillsborough Flood Detention Area was not considered in this study.

2.2 Community Description

The City of Temple Terrace is located northeast of and adjoining the city of Tampa in west-central Florida. Temple Terrace was incorporated in 1925. The name "Temple Terrace" was derived from the development of a new variety of orange, the Temple. This new variety was planted in the grove area of the development where it thrived until a hard freeze in the winter of 1927 or 1928 wiped out most of the trees. The development plan in the 1920's

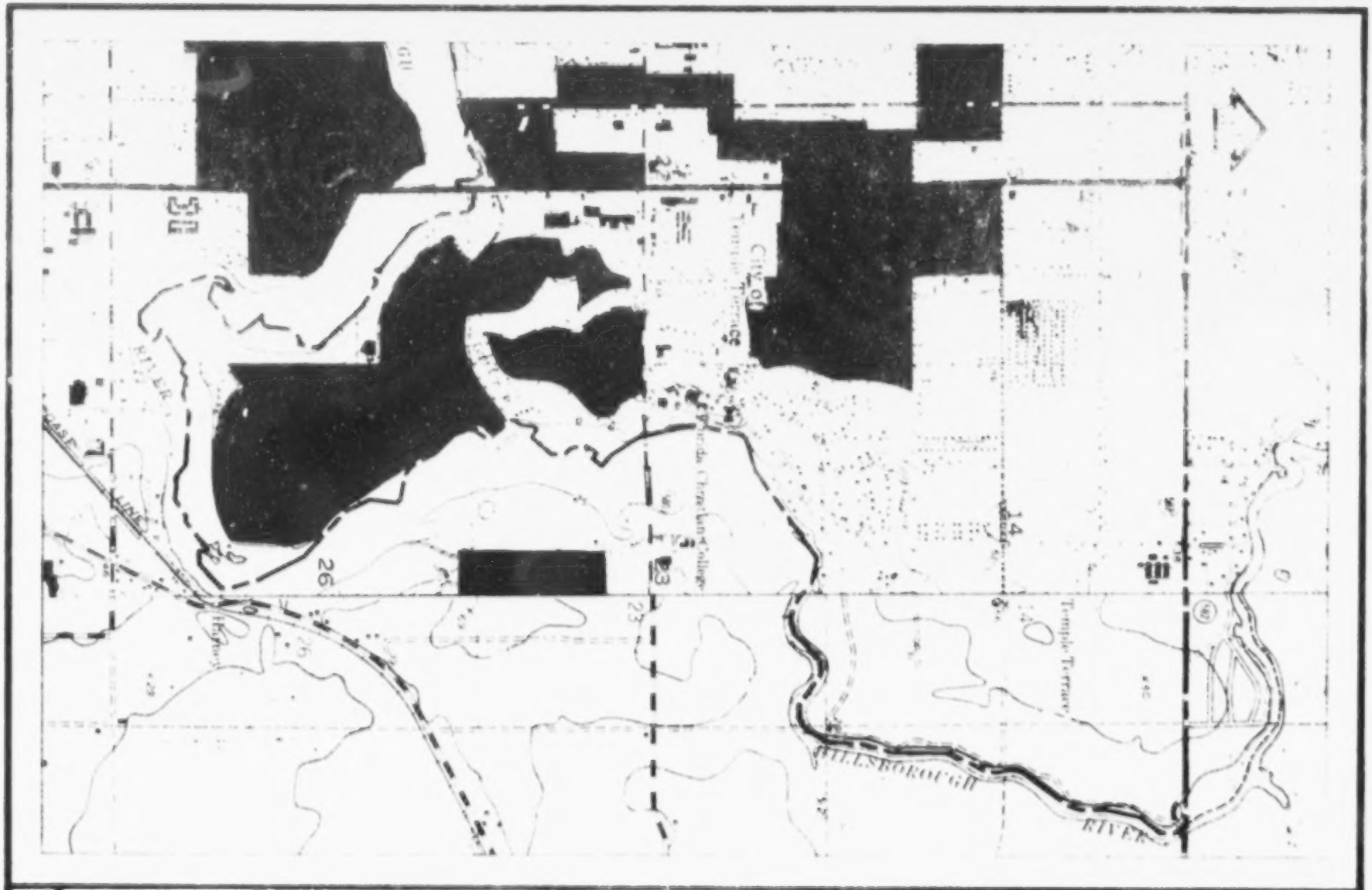

FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TEMPLE TERRACE, FL

(HILLSBOROUGH CO.)

APPROXIMATE SCALE

2000 0 2000 4000 6000 FEET

VICINITY MAP

was to sell homes and grove plots to wealthy retired couples from the North. The years from 1960 to 1975 brought the largest building boom of all times to the city. Banks, shopping centers, new subdivisions, apartment buildings, and many new homes sprang up all over the area. The University of South Florida and development of the industrial park west of the city added many residents. The incorporated areas of the city are bounded on the east and south by the Hillsborough River, on the north by Fowler Avenue, and on the west by the city of Tampa.

In 1970 the population of Temple Terrace was 7347 (Reference 1). It is estimated that 9600 people were living within the city limits in 1975 (Reference 2). A steady growth is expected for the city in the foreseeable future.

Temple Terrace is primarily residential with some commercial development. The topography consists of gently rolling hills except for the flat flood plains along the Hillsborough River. These flood plains are mainly residential.

The climate of Temple Terrace is subtropical. The average annual temperature is 74°F. The average annual precipitation in Temple Terrace is 53 inches, most of which occurs in the rainy season from June to October.

2.3 Principal Flood Problems

The Hillsborough River flows through Temple Terrace in a well defined channel. However, during severe flooding the river can be more than 2000 feet wide in the southern area of Temple Terrace. Floods can occur in Temple Terrace any time during the year; however, they are most frequent during the hurricane season (June through October). The most severe floods are associated with storms, or sequences of storms, which produce widespread distribution of rainfall for several days' duration. Flooding is more severe when antecedent rainfall has resulted in saturated ground conditions when the infiltration is minimal. Cloudburst storms which are characterized by high peak flows, short duration, and small volume can occur any time from late spring to early fall, but do not constitute a serious flood hazard in the study area.

Large magnitude floods have occurred on the Hillsborough River four times during the past 42 years (Reference 3) causing extensive damage to buildings. These floods occurred in September 1933, March 1960, July-August 1960, and September 1960. During the flood of September 1933, the Hillsborough River attained an estimated peak discharge of 16,500 cubic feet per second (cfs) at Fowler Avenue in Temple Terrace. The March 1960 flood peak discharge at Fowler Avenue is estimated at 14,600 cfs.

2.4 Flood Protection Measures

There are no state or local projects for flood control on the Hillsborough River. However, the Tampa Water Works Dam located approximately 10 miles above the mouth of the Hillsborough River was constructed in 1945 to provide water supply impoundment for Tampa. Impoundment elevations range from 20 to 22 feet above mean sea level (msl). The effects of regulation are detectable as far upstream as Temple Terrace Highway, a distance of nearly 7 miles above Tampa Dam; however, the Tampa Water Works Dam does not provide flood protection to Temple Terrace.

The U. S. Army Corps of Engineers has an authorized flood control project for the Hillsborough River Basin (Reference 4). In general, the authorized plan provides for control of floods and improvement of drainage, and for water conservation through the construction of necessary channels, levees, flood detention areas, and control structures. Works serving agricultural areas would be designed to provide full protection from a flood having a 10-year recurrence interval. All detention area outlet structures would be designed for the Standard Project Flood. Works in the Lower Hillsborough Basin, including the Tampa Bypass Canal, would be designed to provide protection to the concentrated urban development at Tampa and Temple Terrace. The Tampa Bypass Canal would be designed so that it, in combination with the Hillsborough River could accommodate the Standard Project Flood. The Lower Hillsborough Flood Detention Area works would be designed so as not to fail during the maximum probable flood. Construction of the Tampa Bypass Canal has been underway since 1966 and the estimated completion date for the project is 1979, subject to Congress appropriating funds to the U. S. Army Corps of Engineers.

3.0 ENGINEERING METHODS

For flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Floods having recurrence intervals of 10-, 50-, 100-, and 500-years have been selected as having special significance for flood plain management and for flood insurance premium rates. The analyses reported here reflect current conditions in the watershed of the stream.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for floods of the selected recurrence intervals for the streams studied in detail in the community.

To define discharge-frequency data for Hillsborough River, the method used consisted of a regionalized annual flood peak-frequency relationship analysis made by the U.S. Army Corps of Engineers Hydrologic Engineering center for the Four River Basins which included the Hillsborough River (Reference 4). This analysis followed the standard log-Pearson Type III method as outlined by the Water Resources Council (Reference 5). The discharges used in this study generally agree with those determined by the U.S. Geological Survey in studies of the Hillsborough River (Reference 6).

The discharge for the 500-year flood on Hillsborough River was determined by straight-line extrapolation of a single-log graph of flood discharges computed for frequencies up to 100 years.

Drainage area-peak discharge relationships for Hillsborough River at Temple Terrace are compared with a gage location on a tributary to the Hillsborough River (Blackwater Creek) on Figure 2. Location and length of record of stream gages used in the study are shown in the following table:

Location	Drainage Area (Square Miles)	Length of Record
Hillsborough River Zephyrhills, Florida	220	October 1939 to Present
Hillsborough River at Fowler Avenue, Temple Terrace, Florida	630	October 1933 to December 1939, January 1961 to Present

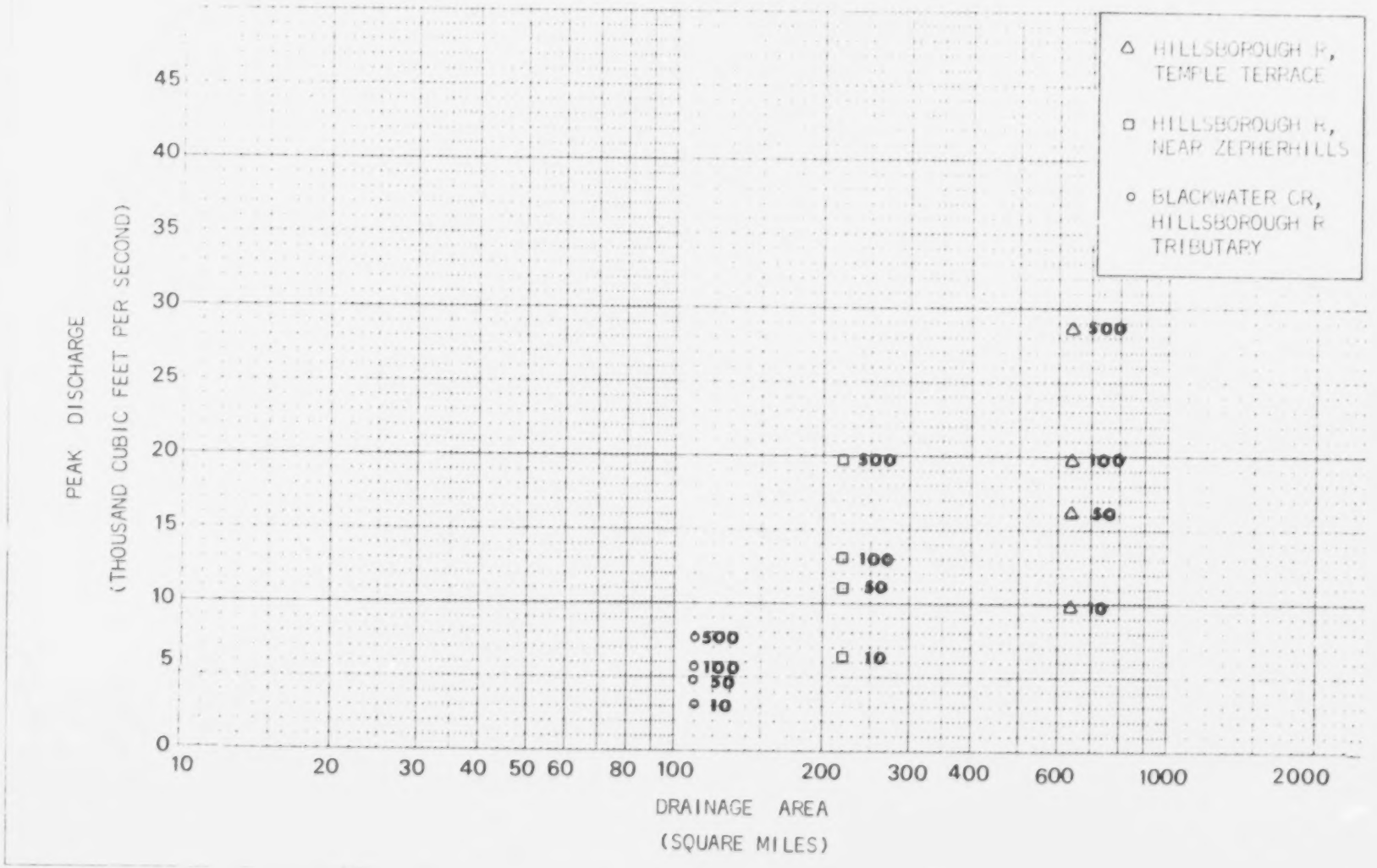

FIGURE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TEMPLE TERRACE, FL

(HILLSBOROUGH CO.)

FREQUENCY-DISCHARGE, DRAINAGE AREA CURVES

HILLSBOROUGH RIVER, BLACKWATER CREEK

Hillsborough River at Tampa Dam near Tampa, Florida	650	October 1938 to Present
Blackwater Creek near Knights, Florida	110	January 1951 to Present

3.2 Hydraulic Analyses

Analysis of the hydraulic characteristics of the Hillsborough River was carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Water-surface elevations of floods of the selected recurrence intervals were computed through use of the U.S. Army Corps of Engineers HEC-2 step-backwater computer program (Reference 7). Cross sections for the backwater analysis were field surveyed and were located at close intervals above and below bridges in order to compute the significant backwater effects of these structures in the highly urbanized area. Locations of selected cross sections used in the hydraulic analysis are shown on the Flood Boundary and Floodway Map (Exhibit 2).

Channel roughness factors (Manning's "n") for these computations were assigned on the basis of field inspection of flood plain areas and previous studies by the U.S. Army Corps of Engineers.

Flood profiles were drawn showing computed water-surface elevations to an accuracy of 0.5 foot for floods of the selected recurrence intervals (Exhibit 1). Starting elevations for the Hillsborough River were taken from a U.S. Geological Survey discharge-rating curve for the Tampa Water Works Dam. All elevations are measured from mean sea level datum; elevation reference marks used in the study are shown on the map panels. The elevation reference mark descriptions are given in Exhibit 3.

During floods, debris collecting at bridges could decrease their carrying capacity and cause greater water depths (backwater effect) upstream of the structures. However, since the occurrence and amount of debris are indeterminate factors, only the physical characteristics of the structures were considered in preparing the profiles. The flood elevations as shown on the profiles are thus considered valid only if hydraulic structures in general remain unobstructed

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

A prime purpose of the National Flood Insurance Program is to encourage state and local governments to adopt sound flood plain management programs. Each Flood Insurance Study, therefore, includes a flood boundary map designed to assist communities in developing sound flood plain management measures.

4.1 Flood Boundaries

In order to provide a national standard without regional discrimination, the 100-year flood has been adopted by the Federal Insurance Administration as the base flood for purposes of flood plain management measures. The 500-year flood is employed to indicate additional areas of flood risk in the community.

For the Hillsborough River, the boundaries of the 100-year and the 500-year flood have been delineated using the flood elevations determined at each cross section; between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:24,000 with a contour interval of 5 feet (Reference 8). In cases where the 100-year and the 500-year boundaries are close together, only the 100-year boundary has been shown.

Some areas within the flood boundaries may lie above the flood elevations determined and, therefore, not be subject to flooding; owing to limitations of the map scale, such areas are not shown.

4.2 Floodways

Encroachment on flood plains, such as artificial fill, reduces the flood-carrying capacity and increases flood heights, thus increasing flood hazards in areas beyond the encroachment itself. One aspect of flood plain management involves balancing the economic gain from flood plain development against the resulting increase in flood hazard. For purposes of the Flood Insurance Program, the concept of a floodway is used as a tool to assist local communities in this aspect of flood plain management. Under this concept, the area of the 100-year flood is divided into a proposed floodway and a floodway fringe. The floodway is the channel of a stream plus any adjacent flood plain areas that must be kept free of encroachment in order that the 100-year flood be carried

without substantial increases in flood heights. Criteria adopted by the Federal Insurance Administration limit such increases in flood heights to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this report are proposed to local agencies as minimum standards that can be adopted or that can be used as a basis for additional studies.

The floodway proposed for this study was computed on the basis of equal conveyance reduction from each side of the flood plain. The results of these computations are tabulated at cross sections on the Hillsborough River (Table 1). As shown on the Flood Boundary and Floodway Map (Exhibit 2), the floodway boundaries were determined at cross sections; between cross sections the boundaries were interpolated.

The area between the floodway and the boundary of the 100-year flood is termed the floodway fringe. The floodway fringe thus encompasses the portion of the flood plain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to flood plain development are shown in Figure 3.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
HILLSBOROUGH RIVER								
A	20,300	1085[2]	10,243	0.6	22.5	22.5	22.5	0.0
B	22,150	970[2]	7609	0.8	22.5	22.5	22.5	0.0
C	23,950	880[2]	6096	0.9	22.5	22.5	22.5	0.0
D	25,550	715[2]	3510	1.7	22.5	22.5	22.5	0.0
E	27,750	480[2]	3013	2.0	22.5	22.5	22.5	0.0
F	29,000	500[2]	3203	1.9	22.5	22.5	23.5	1.0
G	31,250	715[2]	3809	1.6	23.1	23.1	23.1	0.0
H	32,450	402[2]	3731	1.5	23.5	23.5	24.5	1.0
I	33,450	275[2]	2044	2.7	23.7	23.7	24.7	1.0
J	34,750	275[2]	3767	1.5	24.1	24.1	25.1	1.0
K	35,850	377	4082	1.4	24.2	24.2	25.2	1.0
L	37,250	255	2462	2.3	24.4	24.4	25.4	1.0
M	38,250	539	3392	1.6	24.8	24.8	25.8	1.0
N	40,190	539[2]	3529	1.6	25.6	25.6	26.6	1.0
O	42,490	725[2]	4685	1.2	26.3	26.3	27.3	1.0
P	45,890	768[2]	5137	1.1	27.3	27.3	28.3	1.0
Q	48,190	205[2]	2366	2.3	28.0	28.0	29.0	1.0
R	49,740	491[2]	3103	1.8	28.6	28.6	29.6	1.0
S	51,470	310[2]	3895	1.4	29.1	29.1	30.1	1.0
T	57,570	157[2]	3095	1.8	29.5	29.5	30.4	0.9
U	59,820	163[2]	3228	1.7	29.7	29.7	30.6	0.9
V	62,820	1246[2]	9944	0.6	29.8	29.8	30.7	0.9

[1] FEET ABOVE TAMPA CITY DAM
[2] THIS WIDTH EXTENDS BEYOND CORPORATE LIMITS

TABLE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TEMPLE TERRACE, FL
(HILLSBOROUGH CO.)

FLOODWAY DATA

HILLSBOROUGH RIVER

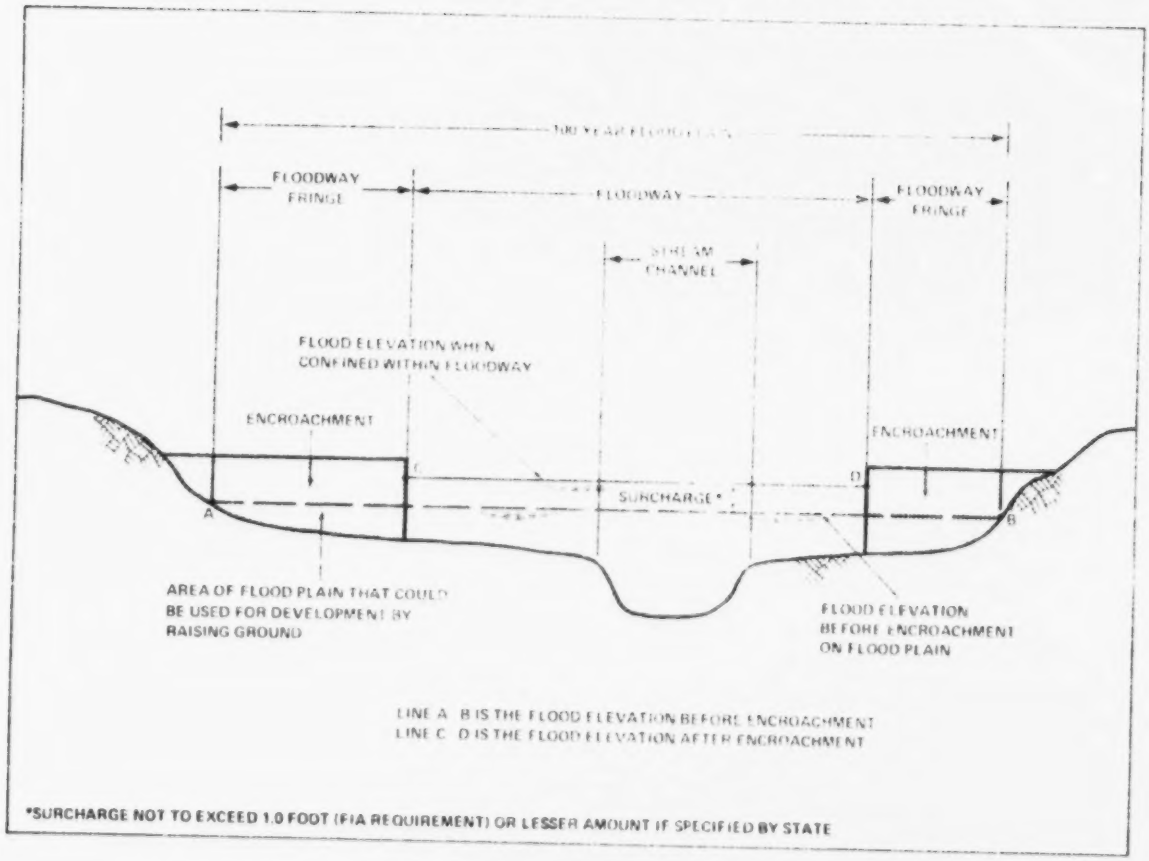
100 YEAR FLOOD ELEVATION
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
SURCHARGE*
A
B
C
D
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE A B IS THE FLOOD ELEVATION BEFORE ENCROACHMENT
LINE C D IS THE FLOOD ELEVATION AFTER ENCROACHMENT
*SURCHARGE NOT TO EXCEED 1.0 FOOT (FIA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE

Figure 3. Floodway Schematic

5.0 INSURANCE APPLICATION

In order to establish actuarial insurance rates, the Federal Insurance Administration developed a process to transform the data from the engineering study into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors, and flood insurance zone designations for each flooding source affecting Temple Terrace.

5.1 Reach Determination

Reaches are defined as lengths of watercourses having relatively the same flood hazard, based on the average weighted difference in water-surface eleva-

tions between the 10- and 100-year floods. This difference does not have a variation greater than that indicated in the following table for more than 20 percent of the reach.

Average Difference Between 10- and 100-Year Floods	Variation
2 to 7 feet	1.0 foot

One reach was required for the flooding source of Temple Terrace. The reach is shown on the Flood Profiles (Exhibit 1).

5.2 Flood Hazard Factors

The Flood Hazard Factor (FHF) is the Federal Insurance Administration device used to correlate flood information with insurance rate tables. Correlations between property damage from floods and their FHF are used to set actuarial insurance premium rate tables based on FHFs from 005 to 200.

The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations expressed to the nearest one-half foot, and shown as a three-digit code. For example, if the difference between water-surface elevations of the 10-year and 100-year floods is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10-year and 100-year water-surface elevations is greater than 10.0 feet, accuracy for the FHF is to the nearest foot.

5.3 Flood Insurance Zones

After the determination of reaches and their respective Flood Hazard Factors, the entire incorporated area of Temple Terrace was divided into zones, each having a specific flood potential or hazard. Each zone was assigned one of the following flood insurance zone designations:

Zone A9: Special Flood Hazard Areas inundated by the 100-year flood; determined by detailed methods; base flood elevations shown, and zones subdivided according to Flood Hazard Factors.

Zone B:	Area between Zone A9 and the limits of the 500-year flood.
Zone C:	Area not subject to flooding by the 500-year flood.

Table 2, "Flood Insurance Zone Data", summarizes the flood elevation differences, Flood Hazard Factors, flood insurance zones, and base flood elevations for each flooding source studied in detail in the community.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for the City of Temple Terrace is, for insurance purposes, the principal result of the Flood Insurance Study. This map (published separately) contains the official delineation of flood insurance zones and base flood elevation lines. Base flood elevation lines show the locations of the expected whole-foot water-surface elevation of the base (100-year) flood. This map is developed in accordance with the latest flood insurance map preparation guidelines published by the Federal Insurance Administration.

6.0 OTHER STUDIES

A Flood Insurance Study for Temple Terrace, Florida (Reference 9) was completed by the U.S. Army Corps of Engineers for the U.S. Department of Housing and Urban Development in June 1972 (Inter-Agency Agreement (IAA)-H-15-72, Project Order No. 7). The present Flood Insurance Study for Temple Terrace supersedes and updates the previous study and presents the data in accordance with current Federal Insurance Administration guidelines.

Flood Insurance Studies for Unincorporated Hillsborough County and Tampa were completed by the U.S. Army Corps of Engineers for the U.S. Department of Housing and Urban Development in September 1972 and August 1972, respectively. The U.S. Army Corps of Engineers is currently conducting Flood Insurance Studies for Unincorporated Hillsborough County and Tampa to update the previous studies. Data developed and used in this Temple Terrace study are in agreement with the studies for Unincorporated Hillsborough County and Tampa. The flood elevations determined in this study do not conflict with the flood boundaries for the surrounding communities.

FLOODING SOURCE	PANEL	ELEVATION DIFFERENCE BETWEEN 1.0 - 100 YEAR FLOOD AND			FLOOD HAZARD FACTOR	ZONE	BASE FLOOD ELEVATION (FEET)[3]
		10% (10 YEAR)	2% (50 YEAR)	0.2% (500 YEAR)			
HILLSBOROUGH RIVER							
REACH 1	0005	0.0	0.0	0.0	005	A1	23
REACH 2	0005	2.1	1.1	1.8	020	A4	VARIES - SEE MAP

[1] FLOOD INSURANCE RATE MAP PANEL
[2] WEIGHTED AVERAGE
[3] ROUNDED TO NEAREST FOOT

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TEMPLE TERRACE, FL

(HILLSBOROUGH CO.)

FLOOD INSURANCE ZONE DATA

HILLSBOROUGH RIVER

The U.S. Geological Survey published an Open File Report in 1974 entitled Flood Profiles of the Lower Hillsborough River, Florida (Reference 6). That report gives flood elevations for varying recurrence intervals from 2 to 100 years on the Hillsborough River. Data developed and used in the Temple Terrace Flood Insurance Study agrees within 0.5 foot with the elevations determined by the U.S. Geological Survey on the Hillsborough River.

7.0 LOCATION OF DATA

Survey, hydrologic, hydraulic, and other pertinent data used in this study will be on file at the office of U.S. Army Corps of Engineers, Jacksonville District, Flood Plain Management Services Branch, 400 West Bay Street, Jacksonville, Florida for 5 years.

8.0 BIBLIOGRAPHY AND REFERENCES

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2. Cleo B. Burney, Temple Terrace, The First Fifty Years 1975

3. U.S. Geological Survey, Water Resources Data for Florida Part I; Surface Water Records, Volume I.

4. U.S. Army Corps of Engineers, Jacksonville District, General Design Memorandum, Supplement 6, Part I, Four River Basins Multi-Purpose Project, 1974

5. Water Resources Council, "A Uniform Technique for Determining Flood Flow Frequencies," Bulletin No. 15, 1967.

6. U.S. Geological Survey, Open File Report No. 74003, Flood Profiles of the Lower Hillsborough River, 1974

7. U.S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-2 Water Surface Profiles, Generalized Computer Program, Davis, California, October 1973

8. U.S. Geological Survey, 7.5-Minute Series Topographic Maps, Scale 1:24,000 Contour Interval 5 feet: Sulphur Springs, Florida (1956); Thonotossa, Florida (1943)

9. U. S. Army Corps of Engineers, Jacksonville District, Flood Insurance Study, Temple Terrace, Florida, 1972

U. S. Geological Survey, Hydrologic Investigation Atlas HA-66, R. W. Pride, 1962

9.0 REVISIONS DESCRIPTION

This section has been added to provide information regarding significant revisions made since the original Flood Insurance Study was printed. Future revisions may be made that do not result in the republishing of the Flood Insurance Study report. To assure that any user is aware of all revisions, it is advisable to contact the community repository of flood hazard data located at the Community Development Building, P.O. Box 16930, Temple Terrace, Florida 33687.

9.1 First Revision (Revised August 19, 1987)

a. Acknowledgments

The hydrologic and hydraulic data for this Revisions Description were obtained from the Flood Insurance Study for the Unincorporated Areas of Hillsborough County, Florida (Reference 10). The Federal Emergency Management Agency (FEMA) reviewed and accepted these data for purposes of this revision.

b. Scope

Flooding of the Hillsborough River was restudied from about 1,200 feet downstream of 56th Street to Fowler Avenue.

c. Hydrologic and Hydraulic Analyses

Elevations for floods of the selected recurrence intervals were computed using the HEC-2 step-backwater computer program (Reference 11).

As a result of the reanalysis, the base flood elevations and flood insurance zone designations have changed.

Roughness coefficients (Manning's "n") used in this study were determined from aerial photographs (Reference 12) and calibrated using high-water marks. Roughness values ranged from 0.030 to 0.080 in the channels and from 0.050 to 0.200 in the overbank areas.

Starting water-surface elevations for the lower reach of the Hillsborough River were taken from the mean high-tide value of Tampa Bay.

Flood profiles were drawn showing computed water-surface elevations to an accuracy of 0.5 foot for floods of the selected recurrence intervals. Cross-section data were field surveyed.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in this study are shown on the map and described in the exhibit labeled Elevation Reference Marks.

d. Floodways

Floodway computations for the Hillsborough River were revised as a result of a new hydraulic analysis. The floodways were computed on the basis of engineering judgment of the floodplain. The results of these computations were tabulated at selected cross sections for each stream segment for which a floodway was revised and are presented in Table 1, Floodway Data.

The area between the floodway and the 100-year floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood more than 1.0 foot at any point.

Due to the scope of the previously effective Flood Insurance Study for this community, a floodway was not determined for certain flooding sources. This Revisions Description incorporates the results of the floodway analysis for the Hillsborough River into the effective Flood Insurance Study.

Encroachment on floodplains, such as structures and fill, reduces the flood-carrying capacity, increases the flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 100-year floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum Federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this study are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

As shown on the Flood Boundary and Floodway Map, the floodway boundaries were computed at cross sections. Between cross sections, the boundaries were interpolated. In cases where the floodway and the 100-year floodplain boundaries are either close together or collinear, only the floodway boundary has been shown. Portions of the floodway of the Hillsborough River lie outside the corporate limits.

e. Other Studies

The City of Temple Terrace is surrounded by the unincorporated areas of Hillsborough County. The Flood Insurance Study for Hillsborough County is in agreement with this study (Reference 10).

f. Bibliography and References

10. Federal Emergency Management Agency, Flood Insurance Study, Hillsborough County, Unincorporated Areas, Florida, March 1980.

11. U.S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-2 Water-Surface Profiles, Generalized Computer Program, Davis, California, April 1984.

12. Real Estate Data, Inc., Real Estate Atlas of Hillsborough County, Florida, Scale 1:3600, 1976.

9.2 Second Revision (Revised June 18, 1990)

a. Acknowledgements

This revision is based on the topographic map (Reference 13) and corporate limits map (Reference 14) as supplied by the City of Temple Terrace.

b. Scope

The Special Flood Hazard Area along the Hillsborough River was revised from a point 1,400 feet downstream of 56th Street upstream to Fowler Avenue based on the more detailed topographic data (Reference 13). Corporate limits were revised and the flooding information for the annexed areas was taken directly from the Flood Insurance Study for the Unincorporated Areas of Hillsborough County (Reference 15). Zone designations are being revised to reflect FEMA Map Initiatives Project guidelines.

c. Insurance Applications

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. The zones are as follows:

Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by detailed methods. Whole-foot base flood elevations derived from the

detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 100-year floodplain, areas of 100-year flooding where average depths are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No base flood elevations or depths are shown within this zone.

The reach determinations, flood hazard factors, and flood insurance zones presented in Sections 5.1, 5.2, and 5.3 are no longer applicable.

d. Flood Insurance Rate Map

The Flood Insurance Rate Map is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 9.2c and, in the 100-year floodplains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols the 100- and 500-year floodplains, the floodways, and the locations of selected cross sections used in the hydraulic analyses and floodway computations.

e. Other Studies

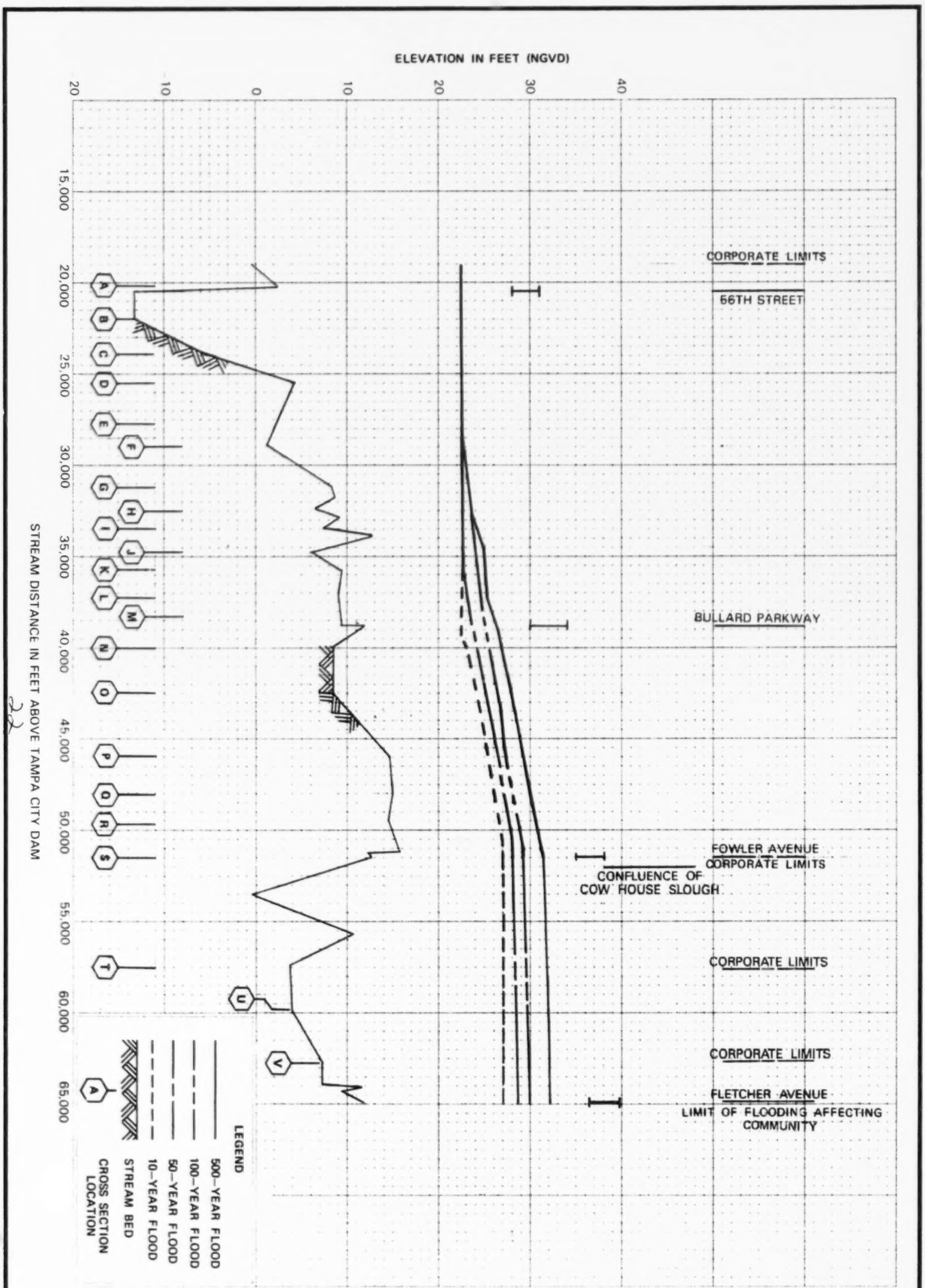
The Flood Insurance Study for the Unincorporated Areas of Hillsborough County (Reference 15) is in agreement with this revised study.

f. References and Bibliography

13. Southwest Florida Water Management District, Hillsborough River Basin, Temple Terrace Aerial Photography with Contours, Scale 1:2400, Contour Interval 1 Foot: September 1978.

14. City of Temple Terrace, City Limit Map of the City of Temple Terrace, Florida, Scale 1:9600, October 1988.

15. Federal Emergency Management Agency, Flood Insurance Study, Hillsborough County, Unincorporated Areas, Florida, March 1980.



01P	FEDERAL EMERGENCY MANAGEMENT AGENCY CITY OF TEMPLE TERRACE, FL (HILLSBOROUGH CO.)	FLOOD PROFILES HILLSBOROUGH RIVER

ELEVATION REFERENCE MARKS

REFERENCE MARK	PANEL	ELEVATION IN FEET (NGVD)	DESCRIPTION OF LOCATION
RM 1	01	30.9	Standard SRD brass disk located on the northwest corner of the north end of the 56th Street bridge across the Hillsborough River.
RM 2	01	28.3	Top of storm sewer manhole cover located on west side of Riverhills Drive about 400 feet southwest from intersection Riverhills Drive and Fern Cliff Avenue.
RM 3	01	30.1	Chiseled plus (+) on southwest sidewalk located at intersection Riverhills Drive and Belle View Avenue.
RM 4	01	36.2	Top of storm sewer manhole cover located on northeast side at intersection Riverhills Drive and Glen Arven Avenue South.
RM 5	01	30.2	Top of storm sewer manhole cover located on south side of Broxburn Avenue about 36 feet from centerline intersection West River Drive and Broxburn Avenue.
RM 6	01	25.9	Top of sanitary sewer manhole cover located in center of intersection of Bellemead Avenue and West River Drive.
RM 7	01	25.7	Top of storm sewer manhole cover located on northeast side at intersection Broxburn Avenue and Bellemead Avenue.
RM 8	01	24.2	Top of sanitary sewer manhole cover located in center of intersection West River Drive and Falmouth Street.
RM 9	01	24.8	Top of sanitary sewer manhole cover located in center of West River Drive at intersection of Courtney Drive.
RM 10	01	25.2	Top of sanitary sewer manhole cover located in center of intersection East River Drive and Vanderbaker Road.

ELEVATION REFERENCE MARKS

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TEMPLE TERRACE, FL

(HILLSBOROUGH CO.)

01E

ELEVATION REFERENCE MARKS

REFERENCE MARK	PANEL	ELEVATION IN FEET (NGVD)	DESCRIPTION OF LOCATION
RM 11	01	30.8	Top of sanitary sewer manhole cover located near center of Vanderbaker Road at intersection Grand Circle North.
RM 12	01	44.6	Top of sanitary sewer manhole cover located in center of intersection of Vanderbaker Road and Riverhills Drive.
RM 13	01	34.5	Standard SRD brass disk located in top of the south end of the wingwall at the west end of the Temple Terrace Highway (Bullard Parkway) bridge across the Hillsborough River.
RM 14	01	45.5	Chiseled plus (+) on concrete slab located about 24 feet south of asphalt road and about 20 feet east of Riverhills Drive.
RM 15	01	29.2	Top of storm sewer manhole cover located on northeast side Riverhills Drive in front of residence located at 914 Riverhills Drive.
RM 16	01	28.4	Top of storm sewer manhole cover located on southwest side Riverhills Drive north of intersection of Glenn Arven Avenue North.
RM 17	01	29.2	Chiseled plus (+) on concrete slab of electrical transformer located about 9 feet east of Riverhills Drive near Rob Rol Place North.
RM 18	01	26.8	Top of sanitary sewer manhole cover located in center of intersection Riverhills Drive and Weeburn.
RM 19	01	28.6	Chiseled plus (+) on concrete slab of electrical transformer located east of Riverhills Drive about 37 feet south of centerline of intersection Ben Lomond Drive.
RM 20	01	30.0	Top of sanitary sewer manhole cover located in center of intersection Riverhills Drive and Druid Hills Road.

FEDERAL EMERGENCY MANAGEMENT AGENCY
CITY OF TEMPLE TERRACE, FL
(HILLSBOROUGH CO.)
02E

ELEVATION REFERENCE MARKS

REFERENCE MARK	PANEL	ELEVATION IN FEET (NGVD)	DESCRIPTION OF LOCATION
RM 21	01	34.0	Top of sanitary sewer manhole cover located in center of intersection Riverhills Drive and Whiteway Drive.
RM 22	01	48.0	Top of fire hydrant located about 20 feet east of centerline Riverhills Drive and about 48 feet south of centerline 114th Avenue.
RM 23*		39.0	Standard SRD brass disk located on the north end of the east abutment of the Fowler Avenue bridge across Hillsborough River.

* LOCATED OUTSIDE OF CORPORATE LIMITS.

ELEVATION REFERENCE MARKS

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF TEMPLE TERRACE, FL

(HILLSBOROUGH CO.)

03E

ELEVATION REFERENCE MARKS

REFERENCE MARK	PANEL	ELEVATION IN FEET (NGVD)	DESCRIPTION OF LOCATION
RM 21	01	34.0	Top of sanitary sewer manhole cover located in center of intersection Riverhills Drive and Whiteway Drive.
RM 22	01	48.0	Top of fire hydrant located about 20 feet east of centerline Riverhills Drive and about 48 feet south of centerline 114th Avenue.
RM 23*		39.0	Standard SRD brass disk located on the north end of the east abutment of the Fowler Avenue bridge across Hillsborough River.

* LOCATED OUTSIDE OF CORPORATE LIMITS.

ELEVATION REFERENCE MARKS

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